PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Stapling Machines

I, WILLIAM GEORGE PANKONIN, of 4928, North Francisco Avenue, Chicago, State of Illinois, United States of America, a citizen of the United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to an improvement in stapling machines.

One of the objects of the invention is to provide a stapling machine having a novel construction of the housing and locking member for the staple driving mechanism whereby the driving mechanism may be assembled and maintained in position without use of screws, rivets or like fastening devices.

Another object of the invention is to provide a stapling machine having means controlled by the action of the driving mechanism to flatly clinch the legs of the staple after they have penetrated the material to be stapled.

Another object of the invention is to provide a stapling machine having a novel construction of the base thereof so that the base and its associated anvil may be swung clear of the staple carrying arm and driving mechanism permitting the device to be used as a tacker.

Another object of the invention is to provide a stapling machine having a novel construction of the riser member to hold the staple driving mechanism in spaced relation to the clinching anvil; a novel construction of the means for detachably securing the staple feeder mechanism in position; a novel construction for the core of the staple magazine; and a novel construction of the cover member for the feeder mechanism.

A still further object is to provide a stapling machine wherein the construction of the ejection chute for staples, the staple driving tool and the guiding means for the driving tool co-operate to permit the use of varying gauge staples without jamming the machine.

According to the present invention I provide a stapling machine of the known type having a staple driving mechanism pivotally associated with a base, the staple driving mechanism comprising the staple magazine and staple feed, and a spring for returning the plunger to inoperative position and also comprising a full stroke mechanism insuring a complete full stroke of a driving tool associated with the plunger, including means on a bearing plate which acts as a removable seat for the spring for carrying also the full stroke mechanism, whereby said bearing plate and full stroke mechanism are conjointly removable from the staple driving mechanism.

Reference will now be made to the accompanying drawings in which:—

Figure 1 is a sectional view in side elevation showing a stapling machine embodying the present invention;

Figure 2 is a bottom plan view, partly in section, showing the riser mechanism and sliding cam support for the flat stitch mechanism;

Figure 3 is a sectional view taken on the line 3—3 of Figure 1, showing the pivoted anvils of the flat stitch mechanism in initial staple leg bending position;

Figure 4 is a sectional view taken along line 4—4 of Figure 1 with the cover and anvils omitted for the sake of simplicity and clearness;

Figure 5 is a view in side elevation, with parts being shown in section, showing the flat stitch mechanism positioned as at the completion of the driving stroke;

Figure 6 is a horizontal section with the cover of the stapling arm removed, showing the fixed anvil and pivoted anvils of the flat stitch mechanism in flattening position;

Figure 7 is a sectional view taken on the line 7—7 of Figure 5

Figure 8 is a fragmentary view, partly in section and partly in rear elevation and with parts omitted, showing the construction of the rear of the housing and staple driving plunger.

Figure 9 is a perspective detail view showing the fixed anvil and one of the pivoted anvils of the flat stitch mechanism;

Figure 10 is an enlarged perspective detail view showing the locking plate for

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the staple driving mechanism; and

Figure 11 is an enlarged fragmentary view in section showing the construction of the ejection chute and of the magazine.

Referring now to the drawings, the stapling machine comprises generally a base 1 to which is pivoted the staple carrying arm 2. Positioned on the forward end of the base 1 are the fixed and pivoted anvils of the flat stitch mechanism 3. Carried on the forward end of the staple carrying arm 2 is the staple driving mechanism 4 which is cooperable with the anvils of the flat stitch mechanism 3 to drive staples from the staple carrying arm 2 through material to be stapled and to flatly clinch the legs of the staple on the under side of the material. The stapling machine is designed to be constructed from sheet metal parts stamped or struck up in dies to render the machine light in weight and economical to manufacture, although the various parts may be otherwise constructed.

THE BASE.

The base 1 is of general inverted dish shape and is enlarged both as to depth and width at the rear portion thereof to provide operating space for the riser 5 and bell-crank 6, and sliding cam support of the flat stitch mechanism. Struck up from the upper rear portion of the base are upright projections 7 forming brackets for the pivotal support of the staple carrying arm 2. In between the brackets, the top surface, and a portion of the rear edge of the base are cut away, as indicated at 8, to provide operating space for the purposes hereinafter set forth. Adjacent one bracket 7, the top surface of the base is provided with a slot 9 through which the bell-crank 6 operates.

Forward of the brackets 7, the underneath portion of the base 1 is provided with two spaced bearings 10 formed by bending down the metal of the base. The bearings 10 form a support for the riser 5 which comprises an elongated member having laterally projecting axles 11, centrally located and operatively positioned in the bearings 10. The rearward end of the riser is bent upwardly as at 12 and projects through the operating space 8. The forward end of the riser is formed with a flat portion 13 offset so as to be spaced from the under portion of the top of the base. Between the offset portion 13 and the under portion of the top of the base is positioned a compression spring 14 held in place by centering knobs formed in the metal of the respective parts. The effect of the spring is to continually urge the upturned end 12 of the riser upwardly. The upturned edge 12 presses against the bottom of the staple carrying arm 2 forward of the pivotal connections 15 to maintain the forward end of the staple carrying arm raised from the flat stitch mechanism 3 a sufficient distance to permit material to be stapled to be readily inserted therebetween. The staple carrying arm 2 may be elevated beyond the raised position of the riser 5, as will be later described.

The forward half of the base is narrower in width and depth than the rear. On the top surface of the forward portion is suitably riveted in place the fixed anvil 16 of the flat stitch mechanism 3. At each end of the fixed anvil the surface of the base is provided with apertures 17 through which the curved positioning fingers 18 of the pivoted anvil members 19 operate. Positioned within the narrower end of the base 1 and below the fixed anvil 16 is a saddle 20. The saddle 20 may be held in place by having the ends 21 thereof upturned and riveted or otherwise secured to the side walls of the base 1. The saddle provides a support for the sliding cam 22 of the flat stitch mechanism 3, as will be hereinafter more fully described. On the top surface of the forward end of the base, positioned forwardly and in alignment with the fixed anvil 16 is a material guide 23 having its forward side sloped as indicated. Positioned within the forward and rearward ends of the base are rubber foot pads 24, which project below the bottom of the base 1, whereby the machine can be supported without injury to desk tops or the like.

STAPLE CARRYING ARM.

The staple magazine or carrying arm 2 comprises an elongated channel 25 formed in cross-section as illustrated in Figure 8, to provide a longitudinally extending inner inverted channel 26 formed from the bottom portion of the channel 25. The sides 27 of the channel 25 have inwardly bent portions 28 on the upper edges thereof to provide a top guide for staples in the magazine. Positioned on the upper surface of the inner inverted channel 26 is a staple track 29 made of a single strip of material formed or counter sunk on its upper surface to provide clearance space for rivet heads. The track 29 may also be attached to channel 26 by spot welding or otherwise. At the rearward end of the channel 25 the metal comprising the sides 27, instead of being formed upwardly extends laterally of the bottom portion of channel 25 to a point spaced sufficiently from the sides 27 to provide stability and operating clearance when the arm 2 is pivoted to the brackets 7. The ends 30 of these longitudinally

extending portions are bent upwardly and are perforated to receive rivets or other securing means by which the staple carrying arm 2 is pivoted to the brackets 7. At the rear of the channel member 25, the sides of the inner inverted channel member 26 are cut away so as to form a sloping edge running from the bottom end point of the main channel to a point on the top of the inner channel just short of the rear end of the staple track. At the forward end thereof, the sides 27 extend beyond the forward edges of the inner channel 26 and staple carrying track 29 a distance substantially equal to the widest or heaviest material used in making staples to be ejected through the device. On these extended edges of the sides 27 there are formed forwardly projecting tabs 31. The forward edges of the inturned flanges 28 are recessed or spaced from the wall 32 to permit the staple driving tool 57 to have free reciprocal sliding movement while guiding it in close proximity to said wall.

At the forward end of the magazine and below the flanges 28 is positioned the ejection or discharge chute for staples. It is proposed to make the chute of sufficient thickness to permit the use of staples made from varying gauges of wire stock. To this end, the forward edges 98 of the staple track or guide 29 and inverted inner channel 26 are spaced rearwardly from the wall 32 a greater distance than the forward edges of flanges 28. The spacing must be slightly less than the combined thicknesses of two staples of the smallest gauge of wire stock desired to be used. As shown in Figure 11, the foremost staple is held entirely within the ejection chute by the pressure of the succeeding staples, while the second foremost staple is partially within the magazine and resting on the forward edge of the guide 29. With this construction staples made of wire stock slightly less than twice the gauge of the smallest stock desired can also be used in the machine. It is preferable to make the thickness of the tool 57 substantially equal to the thickness of the stock of the smallest staple for which the machine is designed. When so constructed the edge of the driving tool 57 is bevelled as shown at 99 in Figure 1 to hold the bridge of the staple firmly against wall 32 during the driving action. It is not necessary to make the tool so thin. When constructed of thicker material it is proposed to supply the edge with a double bevel as illustrated at 100 in Figure 11. The forward bevel maintains the foremost staple in sliding contact with the wall 32 while the rearward bevel wedges the second staple rearwardly toward the magazine, permitting the driving tool to descend and drive the staples without jamming. It is understood that the rearward wall of the ejection chute comprises the next succeeding staple which is constantly urged forward by the feeder mechanism hereinafter described.

The housing H for the staple driving mechanism 4 is carried at the forward end of the staple carrying arm 2. It comprises a forward wall 32, the lower inner surface of which rests against the extended edges of the sides 27 of the channel 25 to form the forward wall of the ejection chute. The forward wall 32 is perforated to receive the extended tabs 31. Projecting rearwardly from the forward wall 32 and at the lower portion thereof are elongated arms 33 overlapping the sides 27. The rearward ends of arms 33 are perforated to snap over and receive therein lugs 34 formed outwardly on the sides 27. The sides 27 also have struck out therefrom clamping tabs 35 which are bent down over the ends of the arms 33 to hold the same flush with the sides 27 and in tight position on the lugs 34.

Above the arms 33 and rearwardly from the front wall 32 are formed side walls 36, there being portions cut away as indicated at 37 to provide access to the ejection chute in the event staples are jammed therein. Formed inwardly on the rear edges of the side walls 36 are the rear walls 38. The opposedly related edges of the rear walls 38 are shaped as clearly indicated in Figure 8 to detachably receive the locking plate 39 (see Figure 10). A cover 40 is associated with the staple driving mechanism housing and the magazine. The lower ends of the forward edge of the sides of the cover 40 have projecting lugs 41 which grip under the bottom edges of the rear walls 38. The remaining portion of the forward edges lie flush with the rear surfaces of the rear walls 38. The top of the cover is spaced from the rear surface of the rear walls 38 to provide clearance for the locking plate 39. The top of the cover slopes generally in a reverse curved line from the top forward edge to the rearward edge, there being on the inner surfaces of the rearward part of the side walls projecting nipples (not shown) having a spring fit with the recesses 42 formed on projections 43 on walls 27 of channel 25. Thus the cover is readily snapped and maintained in position.

Within the cover member 40 is a feeder mechanism which comprises a staple follower 44, a follower rod 45 and coiled compression spring 46, a spring connection block 47, a second rod 48 and coiled

compression spring 49 and a retaining clip 50. The follower 44 is of inverted U-shaped cross-section and rides on the staple track 29. On the top of the follower 44 is fixed an inverted U-shaped member 51, the ends of which are provided with aligned apertures adapted to slidably receive the follower rod 45. The forward end of the follower rod 45 is headed to prevent the U-shaped member 51 from sliding off. To the rearward end of the follower rod 45 is secured, by means of a rivet or otherwise, the spring connection block 47. The spring connection block 47 has a lower opening running longitudinally thereof, and an upper opening immediately above and spaced from the lower opening also running longitudinally of said block. The openings are countersunk from opposite ends of the block to provide sufficient space for the coiled compression springs 46—49 encircling the respective follower rods 45—48. Interposed between the guide member 51 and fitting within the lower opening of the connection block 47 is a coiled compression spring 46. The second follower rod 48 is slidably held within the upper opening in the spring connection block 47. The forward end of rod 48 is headed. To the rearward end of this rod is affixed the clip 50. Interposed between the clip 50 and connection block 47 and encircling the rod 48 and fitting within the upper opening of the spring connection block 47, is a coil compression spring 49. The clip 50 has a fixed jaw member which comprises an upwardly extending lug riveted or otherwise secured to the end of follower rod 48. The lower portion of the upright member extends rearwardly and is bent back upon itself to form a forwardly projecting slide jaw 52 adapted to rest against the top surface of the extending portion of channel 26. Intermediate the ends of the jaw 52 are two downwardly projecting brackets 53 having apertures therein. A lower snap jaw 54 is pivoted intermediate its ends to the brackets 53. The forward end of the snap jaw 54 has an arrow-head latch fitable within the aperture 55 formed in the rear top of channel 26. Interposed between the rear ends of jaws 52 and 54 is a compression spring 55^1.

When the follower mechanism is inserted in the magazine, the follower is urged forwardly under the tension in spring 46. The tension in spring 46 is communicated to the spring connection block 47 which in turn communicates the tension to the compression spring 49, which itself is urged forwardly from the rear end of the follower rod 48. It can be readily seen that when the magazine is filled to capacity and the springs 46—49 fully compressed, they will be substantially contained within the recessed openings in the block 47 in overlapping relationship. With this construction the total overall length of the space occupied by the springs when compressed will be substantially half the space required by a single spring having a sufficient number of coils to urge the follower with sufficient force to the extreme forward end of the ejection chute. Hence, the effective capacity of the magazine is enlarged. The compression in both springs is communicated to the clip 50 which is adequately held from movement by interlocking with the aperture 55 in the extended portion of the channel 26. To remove the staple feeder mechanism it is only necessary to compress the spring 55 releasing the clip 50 from its hold, whereupon the entire assembly may be withdrawn rearwardly from the magazine.

STAPLE DRIVING MECHANISM.

The staple driving mechanism comprises a hollow plunger 56 having secured at the lower forward end thereof a staple driving tool 57. The plunger 56 is reciprocal within the housing H to cause the driver blade or tool 57 to engage and force the staples urged into the ejection chute from the magazine under the urge of the feeder mechanism and drive the same through the ejection chute against the clinching anvil 3. The forward wall 32 of the housing H has an outwardly pressed portion 58 providing an operating space for a lug 59 formed on the forward wall of the plunger 56. These portions form between them an upper abutment limiting the reciprocal movement of the plunger 56 within the housing H. Positioned on the top of the plunger 56 is a cap 60 adapted to receive manual pressure for communication to the plunger proper. Within the plunger 56 is a coil compression spring 61 for urging the same to its raised position. The plunger 56 is preferably formed in rectangular cross-section by folding sheet metal, the meeting edges of the metal forming a part of the rear wall of the plunger. On one of these edges is formed a raised portion 62 being provided with teeth forming the ratchet of a full stroke mechanism, the top end of this portion being bent as indicated at 63 to form a cam tooth. The distance between the front and rear walls of the upper portion of the plunger 56 is less than the distance between the inner surfaces of the front wall 32 and rear wall 38 of the housing H. On its lower portion the plunger 56 is enlarged to provide a sliding bearing for the plunger between the inner surfaces of the front and rear

walls 32—38 of the housing H.

To provide a top bearing for the plunger 56, a support for the detent 64 forming a part of the full stroke mechanism, and a support for the compression spring 61, there is provided a locking plate 39 formed as is shown in Figure 10. The locking plate 39 comprises a flat portion 65 adapted to rest against the outer surface of the rear wall 38. At the top of the plate 39 is provided a hook 66, the width of hook 66 being substantially identical with the distance between the inner surfaces of the side walls 36. The outer surface of hook 66 provides the rear top bearing for the plunger 56. The lower edge of plate 39 is provided with an inwardly projecting portion 67 having formed on its inner edge a spring centering tongue 68. At the juncture of the flat portion 65 and the portion 67, there are provided two sets of notches 69 and 70. Each set comprises opposedly related symmetrically positioned notches. The purpose of the deep notches 69 is to permit the portion 67 to slide down between the edges of the rear walls 38. The purposes of the shallower notches 70 is to provide projections fitable within the notches 71 formed in the edges of the rear walls 38, establishing a positive lock for the locking plate against upward movement. When the ratchet 62 is in engagement with the detent 64, the plunger 56, the locking plate 39, and the spring 61 become one unit, and the spring 61 becomes inoperative to force the locking plate 39 downwardly relative to the housing H.

In assembling the plunger 56 and plate 39 into the housing H, the coil compression spring 61 is fitted within the plunger 56 and over the spring centering tongue 68. As the plate 39 and plunger 56 are inserted from the top of the housing H, the flat portion 65 rides outside of the housing with the edges on the rear walls 38 sliding in the notches 69. When the lug 39 reaches the top edge of the housing H, the plunger 56 is forced rearwardly and downwardly with the hook 66 remaining outside of the housing H until the lug 59 is received in the outwardly pressed portion 58, whereupon the plunger 56 is moved forwardly in the housing H, and the hook 66 inserted between the rear of the plunger 56 and the inner surface of the rear walls 38 of the housing. The plate 39 is then moved downwardly to the limit of the hook 66, whereupon the tension in spring 61 will cause the inwardly projecting portion 67 to move outwardly of the housing H so that the projections formed by the shallower notches 70 fit within the notches 71, locking the plate 39 and plunger 61 in operable position within the housing.

To disassemble the plunger 56 and plate 39 from the housing H, it is only necessary to manually force the lower end of the plate 39 inwardly until the notches 69 register with the edges of the rear walls 38, whereupon the plate 39 may be slid upwardly against the tension in the coil compression spring 61 until the hook 66 clears the top of the housing H. The hook 66 may then be moved rearwardly or laterally clear of the housing, freeing the plunger 56 for rearward movement thereby permitting the lug 59 to be clear of the pressed out portion 58 and the plunger withdrawn.

On the rear portion of the locking plate 39 there are two spaced rearwardly projecting brackets 72 for holding the shaft 73 upon which the detent 64 is swivelly mounted. A coil spring 74 is provided on the shaft to urge the detent 64 inwardly toward the ratchet 62 on the plunger 56 and laterally to one side. The detent 64 is engageable with the ratchet 62 through an aperture 75 provided in the locking plate 39 and through the space between the oppositely related edges of the rear walls 38.

FLAT STITCH MECHANISM.

As previously described, the flat stitch mechanism comprises a fixed anvil 16, the form of which is clearly illustrated in Figure 9. Extending longitudinally and centrally of the top surface of the fixed anvil is a staple guiding groove 76. The fixed anvil is secured to the top surface of the forward end of the base 1 with the groove 76 in alignment with the ejection chute of the staple carrying arm 2 by means of lugs 77 formed on the lower edges of the fixed anvil 16 and riveted to the base. Pivotally secured to the fixed anvil 16 are movable anvils 19. The movable anvils 19 are duplicates in construction and size; each comprises a body portion having extending laterally thereof two spaced fingers 78 having apertures for receiving a shaft 79 by which anvil 19 is pivotally secured to the fixed anvil 16. A portion of the surface of the body portion is sloped as indicated at 80 so that with the anvil 19 disposed at an angle upwardly of the surface of the fixed anvil 16, the sloped portion 80 will be substantially horizontal. On the top of the body portion the anvil 19 is provided with a staple guiding groove 81 so positioned as to be in alignment with the guiding groove 76 in the fixed anvil 16 when the pivoted anvil 19 is lowered to its horizontal position. The groove 81 is in alignment with the ejection chute of the staple carrying arm 2 and is of an extent

sufficient to receive the leg of the staple as it penetrates through the material.

The sloped portions 80 of the pivoted anvils 19 when in their raised position provide flat surfaces against which the material to be stapled rests during the initial driving of the staple. To maintain the pivoted anvils 19 in raised position there is provided on each anvil 19 a curved finger 18 projecting downwardly from the outer edge of the body portion. The fingers 18 operate through apertures 17 provided in the base 1 and are cooperable with the camming and flat surface of the slidable cam 22. With the pivoted anvils 19 in raised position and with the fingers 18 resting on the flat surface of the sliding cam 22, the legs of staples as they are forced through material by the action of the staple driving tool 57 will strike against the grooves 81 and be deflected inwardly and an initial bend placed on them. After the initial bend has been formed on the legs of the staple, it is desirable to permit the pivoted anvils 19 to resume a horizontal position with the guiding grooves 81 in alignment with the guiding groove 76 so that further driving action will flatly press the legs of the staple against the under surface of the material being stapled. To accomplish this end, the sliding cam 22 is controlled by the action of the staple driving mechanism 4 so that it will be moved rearwardly after a desired portion of the driving stroke has occurred. The rearward movement permits the curved fingers 18 to slide down the sloping face 82 and the pivoted anvils 19 assume a horizontal position resting flatly on the upper surface of the base 1.

The forward end of the sliding cam 22 is held in position by the saddle 20 and is guided by a slot and pin arrangement 83 to maintain it in accurate alignment with the curved fingers 18. Rearwardly and to one side of the forward end of the cam slide 22 there is provided an extending arm 84 running within the interior of the base 1 to a point substantially below one of the brackets 7. Secured to the outer surface of one of the brackets 7 by means of a pivot 85 is the bell-crank 6. The lower arm of the bell-crank 6 projects through the aperture 9 in the top portion of the base 1 and is pivoted to the end of arm 84. The upper arm of the bell-crank 6 is positioned above the surface of the base 1 and extends forwardly of the pivot 85 to engage with the operating arm 86 carried on the side of the staple carrying arm 2. Positioned on the side of the staple carrying arm 2 are three longitudinally spaced bearings 87 in which is rotatably supported a transmission rod 88. At the rear end of the rod 88 is secured by means of a dowel pin (not shown) the operating arm 86 which extends outwardly from the side of the staple carrying arm 2 and has its operating end in alignment with the upper arm of the bell-crank. At the forward end of the rod 88 is secured in a similar manner an operating trigger 89 so positioned as to extend upwardly along the side 36 of the housing H. The end of trigger 89 is sloped to provide a cam for cooperation with a camming member 90 slidably carried on the side wall 36. The cam member 90 is secured to the side wall 36 by means of grooves 91 provided in opposite sides thereof and cooperable with retaining lugs 92 riveted to the side wall 36. The upper end of the camming member 90 is provided with an upwardly extending connecting arm 93 spaced from the side wall 36. An elongated slot 94 is provided on arm 93. Secured to the cap 60 and extending downwardly therefrom in substantial alignment with the side 36 is a driving rod 95, the lower end of which lies between the arm 93 and the side wall 36 and is provided with an adjusting screw 96 fitting within the slot 94.

The cam member 90 by means of the adjusting screw 96, can be so adjusted upwardly or downwardly as to vary the point at which the trigger 89 will be operated relative to the full movement of the plunger 56. A coil spring 97 is provided on the under surface of the base 1 and is positioned to continually urge the sliding cam 22 forward.

In the operation of the device just described, material is inserted between the surfaces 80 of the pivoted anvils 19 and the staple carrying arm 2. As pressure is applied to the operating cap 60, the arm 2 is depressed against the urge in spring 14 compressing the material tightly between it and the surfaces 80. Continued pressure on the cap causes the plunger 56 to move downwardly, whereupon the driving blade 57 engages the bridge of a staple (positioned in the ejection chute under the urge of the feeder mechanism) and forces the same downwardly so that the legs penetrate through the material and engage in the grooves 81 sloped relatively thereto. The engagement between the grooves 81 and the legs bends the legs inwardly as the staple is continued to be forced through the material. At a predetermined time, depending upon the adjustment of camming member 90, the sloping surface thereof engages with the cam surface of the trigger 89, forcing it outwardly of the side 36, thereby applying torque to the transmission rod 88 causing

the arm 86 to press against the upper arm of the bell-crank 6 which in turn causes the lower arm of the bell-crank 6 to move rearwardly drawing with it (and overcoming the force in spring 97) the sliding cam 22. The rearward movement of the sliding cam 22 causes the sloping surface 82 on the forward end thereof to come in alignment with the curved fingers 18 of the movable anvils 19. The pressure exerted on the outer ends of the pivoted anvils 19 during a driving stroke is communicated through the curved fingers 18 to the sloping surface 82 of the slidable cam 22 which aids in causing it to move rearwardly permitting the pivoted anvils 19 to assume a flat position on the surface of the base. Thereafter, continued pressure exerted on the cap 60 will flatten the curved portion of the legs of the staple and clinch the legs flatly and tightly against the under portion of the material.

The present device may be used as a tacker machine by swinging the base 1 counter-clockwise about its pivotal connection with the staple carrying arm 2. As previously described, the rear portion of the base 1 is cut away at 8 so as to provide clearance space for the feeder mechanism and end of the cover member 40 permitting the base to swing through a turn in excess of 180 degrees. In swinging the base and using the machine as a tacker the mechanism operating the flat-striker is not disturbed. The operating arm 86 will lift away from the bell crank 6 when the device is converted from a stapling machine to a tacker. It is not necessary to disconnect any portion of the mechanism for this operation.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A stapling machine of the known type having a staple driving mechanism pivotally associated with a base, the staple driving mechanism comprising the staple magazine and staple feed, and a spring for returning the plunger to inoperative position and also comprising a full stroke mechanism insuring a complete full stroke of a driving tool associated with the plunger, including means on a bearing plate which acts as a removable seat for the spring for carrying also the full stroke mechanism, whereby said bearing plate and full stroke mechanism are conjointly removable from the staple driving mechanism.

2. A stapling machine as set forth in claim 1, characterised by the fact that the spring of the plunger constitutes means for retaining this bearing plate and supporting member of the full stroke mechanism in operative position.

3. A stapling machine as set forth in claims 1 and 2, including on the bearing plate a hook member whereby the bearing plate is secured to the housing of the plunger in detachable position, said hook member of the bearing plate engaging over the upper edge of the housing, while the abutment for the plunger spring is secured to the lower end of the bearing plate.

4. A stapling machine as set forth in claim 3, including on the housing a stop element co-operating with a portion of the plunger to prevent said plunger from being withdrawn from the housing, the bearing plate forming a spacing member for retaining the stop means in abutting relation.

5. A stapling machine as set forth in claim 3, including tongue and groove means between the bearing plate and the housing, which tongue and groove means are lockable under the influence of the spring reacting between the plunger and a portion of the bearing plate.

6. A stapling machine as set forth in claims 4 and 5, wherein the bearing plate is removable from the space between the housing and the plunger to permit sufficient lateral movement of the plunger to cause the stop means to be disengaged.

7. A stapling machine as set forth in claims 4, 5 and 6, including on the seat for the plunger spring formed on the bearing plate, a groove adapted to receive the edges of a slot in the housing, and notch and key means between the bearing plate and the housing, which means are maintained in engagement with the housing by the reaction of the plunger spring.

8. A stapling machine as set forth in claim 1, including on the plunger an offset portion, the bearing plate forming a portion complementary to the offset portion of the plunger, whereby said plunger is partly guided on the bearing plate and partly by means of the offset enlarged portion thereof on the housing.

9. A stapling machine as set forth in claim 1, including a channel member forming the arm for the staple feeding device and a housing for the staple driving mechanism, said channel member and housing being fitted one within the other, a struck-out portion on one of the members being clamped against the other to hold the members firmly together.

10. A stapling machine as set forth in claim 1, with an ejection chute through which the staples are discharged upon actuation of the plunger and the driving

tool associated therewith, including guiding means for the driving tool above the chute, the thickness of the ejection chute being greater than the thickness of the tool.

11. A stapling machine as set forth in claim 10, including in the ejection chute a fixed space to act as clearance space for variable thicknesses of staples to be discharged therethrough, the thickness of the tool being less than the fixed space.

12. A stapling machine as set forth in claim 10, including on the driving face of the driving tool a bevel sloping upwardly and forwardly of the stapling device.

13. A stapling machine as set forth in claim 1, including on a fixed anvil member on the base, a groove for receiving the transverse portion of the staple to be driven, and including grooves on pivoted anvil members co-operating with the fixed anvil member, said pivoted anvil members also being provided with grooves in angular relation to the groove on the fixed anvil member during the initial driving action of the staple driving mechanism.

14. A stapling machine as set forth in claim 13, including means operated by the staple driving mechanism to cause means supporting the pivoted anvil member to move, thereby bringing the grooves on the pivoted anvil members from angular relation to the groove of the fixed anvil member into substantial longitudinal alinement with said last named groove.

15. A stapling machine as set forth in claims 13 and 14, including in the control mechanism for the anvil, a cam member carried by the staple driving mechanism and a cam member carried by the base, and means operatively connecting the cam members at a pre-determined point of movement of the staple driving mechanism for controlling thereby the movement of the pivoted anvil members, the connection between said cam members and their disconnection being feasible in spite of the pivotal interconnection between the staple driving mechanism and the base.

16. A stapling machine as set forth in claims 1 and 15, and in which the staple driving mechanism comprises a reciprocal plunger, including means for securing the cam member of the staple driving mechanism to said plunger, the connection between the cam member of the base and the cam member of the plunger including a transmission rod with a trigger under the influence of the cam member of the plunger, and including a lever on the transmission rod adapted to act on a bell crank which controls the movement of the cam member in the base.

17. A stapling machine as set forth in claims 13 and 14, including on the movable anvils flat surfaces disposed in each anvil at an angle to the upper surface, the staple driving mechanism controlling both of said movable anvils so as to maintain them with their flat surfaces in horizontal alinement and with the upper surfaces and associated grooves sloping towards the fixed anvil and the groove of said fixed anvil during a part of the operation of the mechanism.

18. A stapling machine as set forth in claim 1, including as means for urging the staples forwardly, a series of coiled compression springs acting through a staple follower on the staples in the magazine, whereby the space occupied by the urging mechanism will be reduced in proportion to the number of compression springs used.

19. A stapling machine as set forth in claim 18, including an elongated connecting block for transferring the compression in one spring to the other spring, the block maintaining the springs in spaced end to end relationship with the adjacent end portions thereof in overlapping relationship.

20. A stapling machine as set forth in claim 19, including a rod slidably engagable with the follower, the connection block being secured to the rod and having an enlarged recess, one of the coiled compression springs being carried on the rod between the follower and the block and fitting within the recess, the connecting block having a second recess extending from the opposite end of the block and spaced vertically from the first recess, a second rod slidably carried by said block within the second recess, a coiled compression spring on the second rod, a bracket and fastening clip secured to the rearward end of said second rod, the second compression spring being located between said bracket and said connecting clip.

21. A stapling machine as set forth in claim 1, and pertaining to the type of stapling machine in which the staple driving mechanism is normally maintained a predetermined distance from the anvil, including as means for maintaining said staple driving mechanism spaced from the anvil, a spring control lever centrally fulcrummed to the lower surface of the base and having one end portion extending upwardly engageable with the arm in which the staple driving mechanism is housed.

22. A stapling machine as set forth in claim 1, with a staple guide in the form of a channel located in the arm which carries the staple driving mechanism, the side wall at the pivoted end of the arm extending laterally beyond the side walls

of the channel proper, and being pivotally connected with brackets rising from the base to form the pivotal supports for the arm.

23. A stapling machine, substantially as described and shown, and for the purpose set forth.

Dated this 25th day of July, 1938.

For the Applicant,
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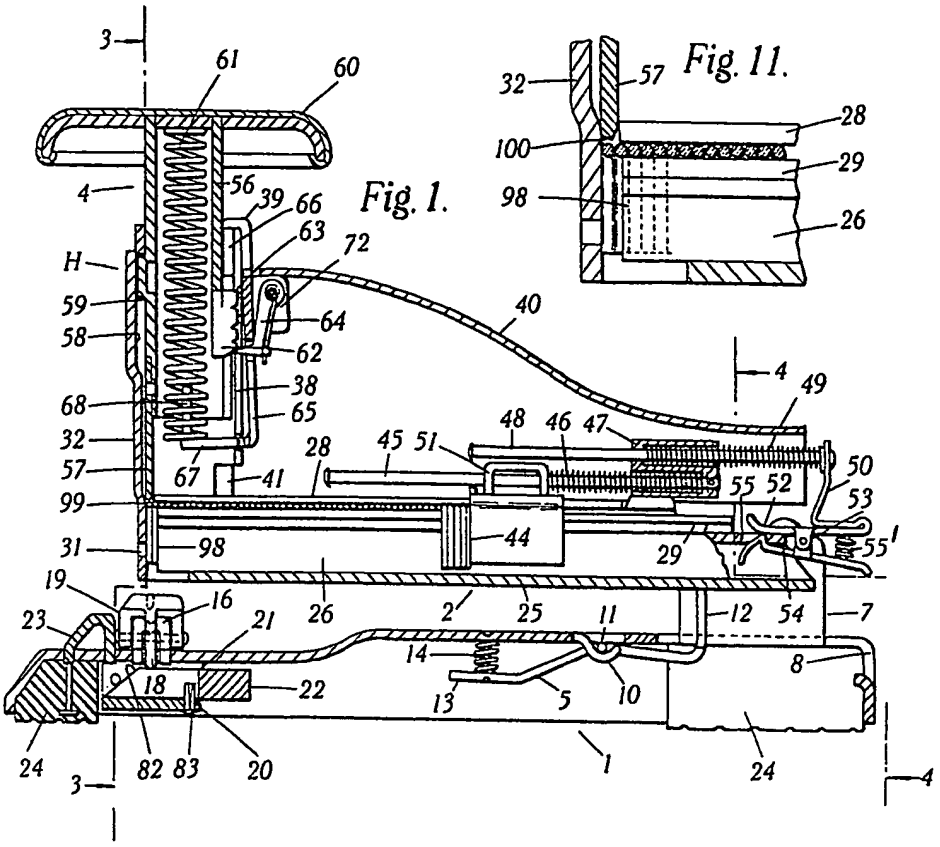


Fig. 1.

Fig. 11.

Fig. 2.

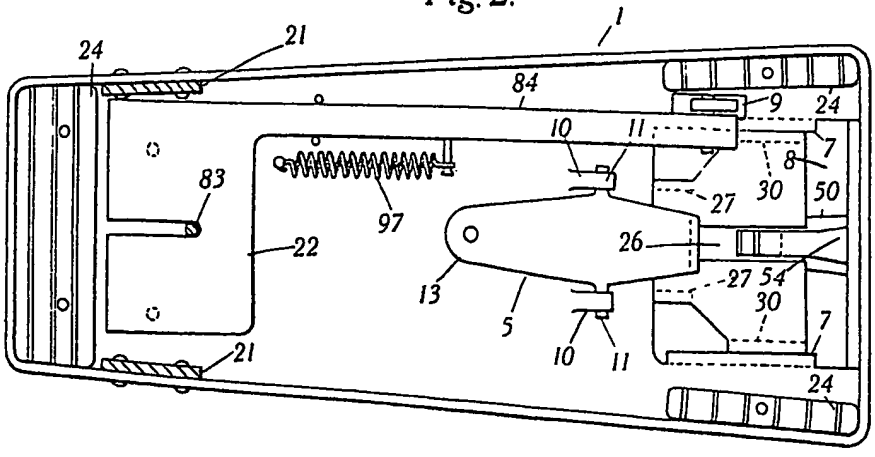
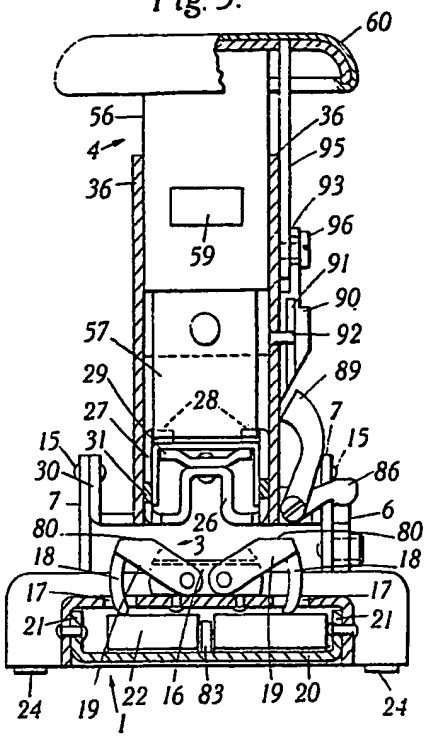


Fig. 3.



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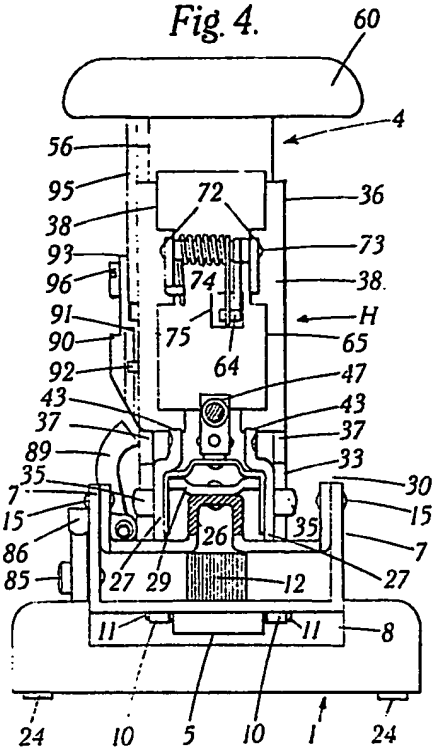

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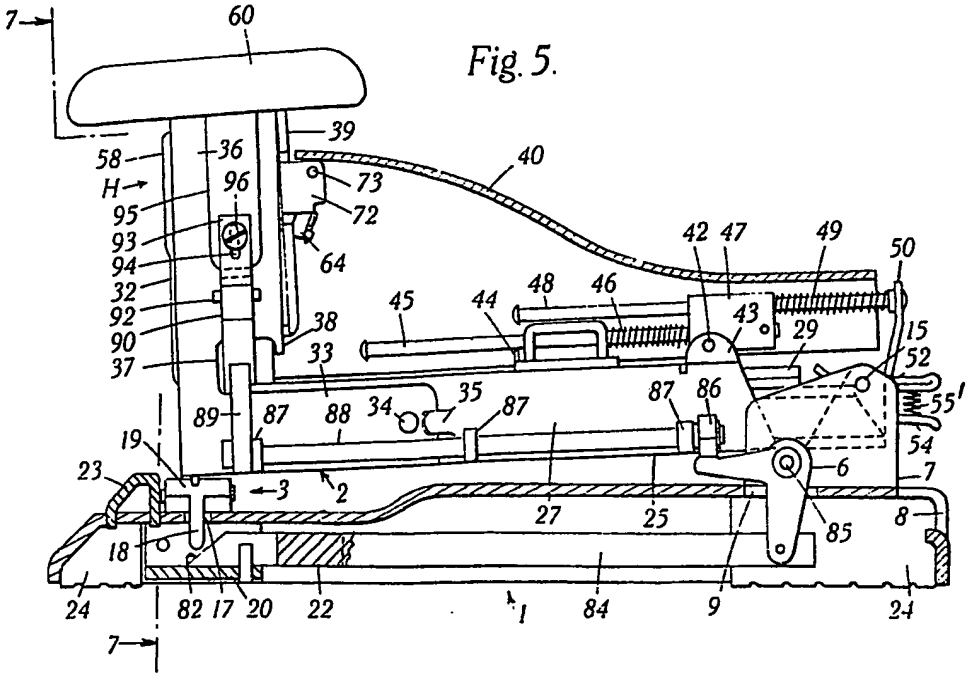


517,352 COMPLETE SPECIFICATION

SHEET 1

[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 1.

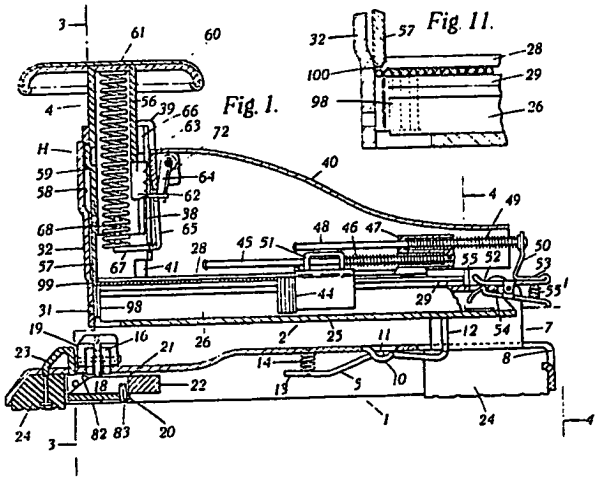
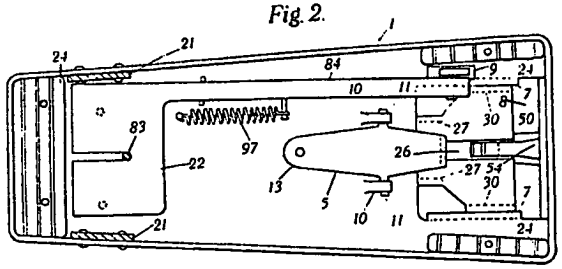


Fig. 11.

Fig. 2.



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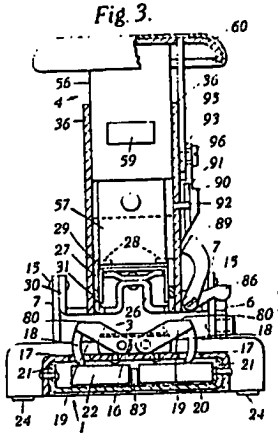

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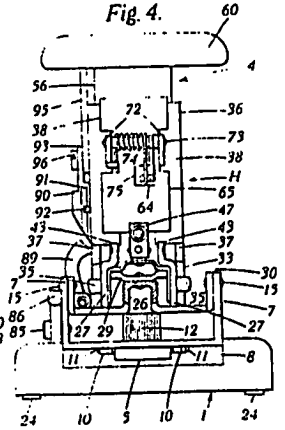

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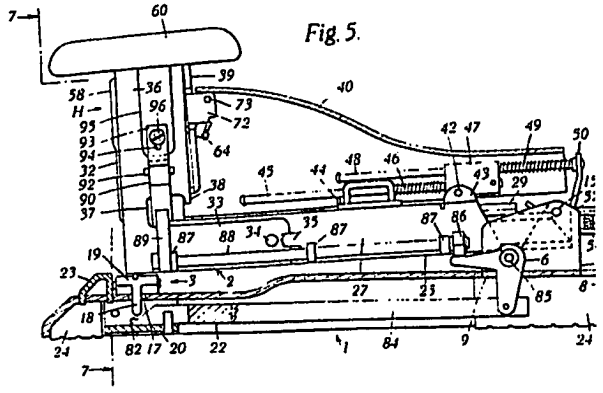

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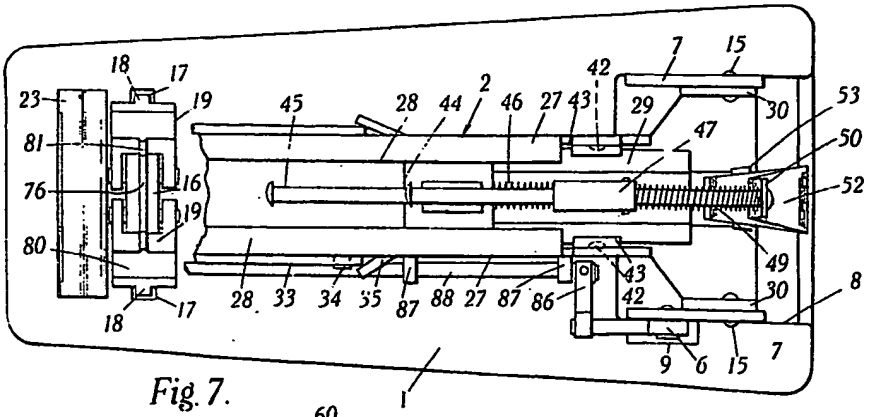
Fig. 6.



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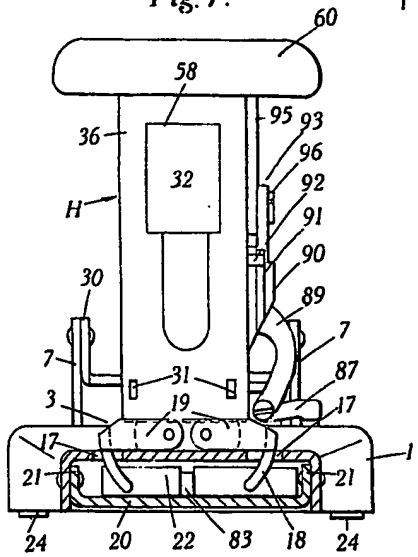

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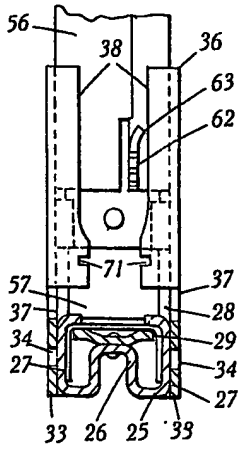

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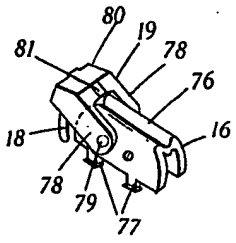

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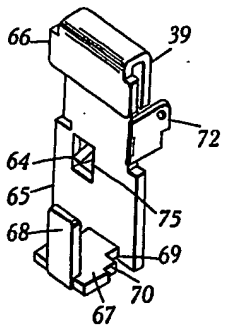

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